Copper (0) nanoparticles in glycerol: an efficient and versatile catalyst for hydride-free reduction of nitro derivatives

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Due to their importance in the chemical and pharmaceutical industries, many synthetic routes have been reported for the catalytic reduction of aromatic nitrocompounds to the corresponding aryl amines. However, these systems normally operate under strong and risky conditions and involve the utilization of hazardous reducing agents such as H_2, $NaBH_4$, formic acid or hydrazine hydrate. Thus, simple, environmentally friendly, highly efficenty and inexpensive alternatives are needed.

Herein, we report an efficient and hydride free method for the chemo selective reduction of aromatic nitro compounds catalyzed by Cu nanoparticles. Aiming to carry out the reaction lowering the energy and time consumption, enabling technologies such as microwaves and ultrasounds have been applied. In addition, bio-glycerol has been employed as hydrogen source, making the process attractive in terms of ease of handling, non-toxic nature and environmental perspectives.

The new technique allowed to selectively synthesize azoderivatives as well as fully reduced amino compounds. Specifically, nitrocompounds were reduced to anilines operating at high temperature, while corresponding azoderivatives were synthesized operating at lower temperature. A wide range of anilines with different substituents and symmetric azocompounds was obtained in a single reduction step, with excellent yields and in a very short reaction time.

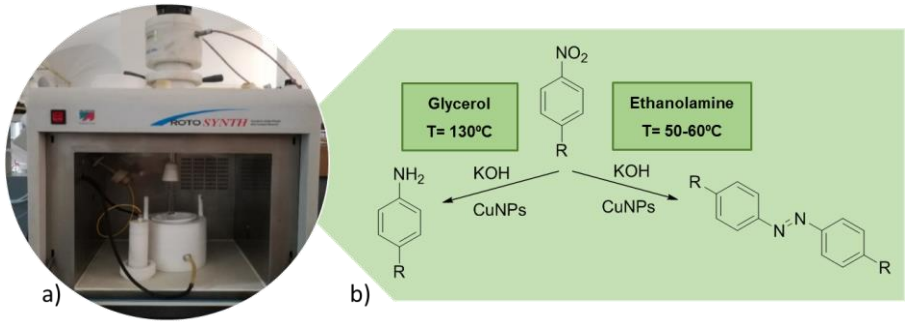

Figure 1:a) Combined MW/US device. b) Selective reduction of aromatic nitrocompounds.

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